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| 10/579,565 | 05/12/2006 | Samuel Charles Hyde | IP21L9.001 APC | 5508 |
| 20995 | 7590 | 11/17/2009 | EXAMINER | |
| KNOBBE MARTENS OLSON & BEAR LLP | | | PHAM, HAI CHI | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/579,565 | Applicant(s) HYDE ET AL. | |
| | Examiner Hai C. Pham | Art Unit 2861 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-29 and 31-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-29 and 31-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/08/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/08/09 has been entered.

Claim Objections

2. Claims 31, 32 are objected to because of the following informalities:

Claim 31:

- Line 4: "a substrate" should read --the substrate--, since the limitation has been recited earlier within the claim.

Claim 32:

- Line 4: "a substrate" should read --the substrate--, since the limitation has been recited earlier within the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 17, 23, 24, 31, 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamakawa et al. (US 6,633,319).

Regarding claims 31, 32: Yamakawa et al. discloses a laser thermal printing system configured to mark a substrate (thermal recording medium 1A) (Fig. 19), the system comprising a laser light emitting source (laser diodes 31t, 31b, 31g, 31r), the substrate 1A formed of at least one of paper, a sheet form, synthetic paper and resin film (thermal recording medium 1A comprises a base layer 2, an intermediate layer 3, a recording layer 4 and a protective layer 5, the base layer 2 being a sheet of flexible material such as paper or PET film) (Fig. 1) (col. 5, lines 51-59), means for displacing said substrate to said laser light source 31 (the thermal recording medium 1A is transported past the thermal printing station in the direction D using, for example, conveyance rollers 11 and 12) (Figs. 17, 19) (col. 23, lines 8-22), wherein the displacing means 11 & 12 is configured to expose a surface of the substrate 1A to light from the laser light emitting source 31 (Fig. 19), and the exposed surface is sufficiently sensitive to light from the laser light emitting source 31 that, when exposed, energy is absorbed at least one point of said substrate 1A, whereby a reaction occurs which changes the color of the exposed surface and said substrate 1A is the printed product of said laser

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marking system (the thermal recording medium 1A comprises infrared absorbent dispersed in the intermediate layer 3 or in the protective layer 5 such that the thermal recording medium changes color when exposed to heat generated by the irradiation of the laser beams) (col. 10, lines 41-51), and means for transmitting light from said laser light emitting source 31 to the exposed surface (the laser beams are collimated by the respective collimator lenses 32 and scanned the thermal recording medium 1A by an f- θ lens) (Fig. 19) (col. 24, line 58 to col. 25, line 7), wherein said laser light emitting source 31 comprises an array of lasers 31t, 31b, 31g, 31r arranged for simultaneous multi-point marking (Fig. 19). And said array of lasers comprise semi-conductor laser diodes configured to emit light in at least one of the infra red and near infra red spectrums (the laser diodes 31 are either infra red or near infra red lights for irradiating the thermal recording medium 1A, which contains either infra red or near infra red absorbent to provide the function of converting light into heat to enable the recording layer 4 to change color) (col. 10, lines 41-51) (col. 19, lines 20-32).

Yamakawa et al. further teaches:

- (claim 17) a heater (preliminary heating plate 18) configured to heat said exposed surface prior to the exposed surface being exposed to the laser light (Fig. 17).
- (claim 23) at least one optical element, i.e. collimator lens 32 and f- θ lens, being located between said lasers 31 and said substrate 1A (Fig. 19) (col. 24, line 58 to col. 25, line 7).

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- (claim 24) at least one optical element incorporates at least one of a single bulk lens, i.e. single collimator lens 32, and a reflector, i.e., polygon mirror 34 (Fig. 19).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 17, 19-24, 26, 31-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. (US 5,909,232) in view of Yamakawa et al.

Regarding claims 31, 32: Goto et al. discloses a laser marking system configured to mark a substrate (thermal recording medium S), the system comprising a laser light emitting source (laser diode 12), a substrate formed of at least one of paper, a sheet form, synthetic paper and resin film (the thermal recording medium S being formed of a sheet form) (Fig. 1), means for displacing said substrate to said laser light source (the thermal recording medium Sb is transported past the irradiation beam L station by the conveyance rollers 41a, 41b and the belt 43) (Fig. 7), wherein the displacing means is configured to expose a surface of the substrate Sb to light from the laser light emitting source 12 (Figs. 1, 7), and the exposed surface is sufficiently sensitive to light from the laser light emitting source 12 that, when exposed, energy is absorbed at least one point of said substrate, whereby a reaction occurs which changes the color of the exposed

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surface and said substrate Sb is the printed product of said laser marking system (the thermal recording medium contains materials such as leuco dyes, a developer and light-absorbing dyes, that develop color when heated with the irradiation of the laser beam L) (col. 2, lines 51-61), and means for transmitting light, i.e. optics 14, 16, 22, from said laser light emitting source 12 to the exposed surface (Fig. 1),

Goto et al. fails to teach the laser light emitting source comprising an array of lasers arranged for simultaneous multi-point marking, and the laser array emitting laser beam in the infra red or near infra red region.

However, it is old and well known in the art to use suitable laser light source emitting laser beam that is sensitive to the exposed medium as evidenced by Yamakawa et al. where either an infra red or near infra red laser diode array is used to expose the thermal recording medium 1A having a layer that absorbs light in the same spectrum region (col. 10, lines 41-51) (col. 19, lines 20-32).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Goto et al. with the teaching of Yamakawa et al. by incorporating the infra red laser array or the near infra red laser array for exposing the thermal recording medium since the sensitivity of both the recording medium and the radiation source should be compatible so as to obtain an optimum result in recording the color image.

Goto et al. further teaches:

- (claim 17) a heater, i.e. pre-heating light source 47, configured to heat said exposed surface prior to the exposed surface being exposed to the laser light

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L (the pre-heating light source 47 preheats the thermal recording medium Sb before the medium is being exposed by the laser beam L emitted from the laser 12) (Fig. 6B) (col. 7, lines 59-64).

- (claim 19) the heater comprises a light emitter (pre-heating light source 47) (Fig. 6B).
- (claim 20) another light emitter, i.e. pre-heating laser diode 102, positioned adjacent to said laser diode 104 and adapted to supply sufficient light so as to bring said substrate Sb close to the marking threshold, wherein while said array of lasers emits light, and the exposed surface passes the marking threshold due to the combined effect of said laser array and said other light emitter (the preheating laser diode 102 preheats the thermal recording medium Sb so as to bring the temperature of the thermal recording medium Sb up to a temperature that is below the color developing temperature, and the irradiation of the laser beam L from the laser diode 104 will bring the final temperature of the thermal recording medium Sb above the threshold for color developing) (Fig. 28) (col. 15, lines 13-19).
- (claim 21) said light emitter 47 emits light to said exposed surface at a point substantially coincident with the point of light L from the laser light emitting source 12 (Fig. 6C).
- (claim 22) means for varying the energy supplied to each point of the exposed surface by varying over time at least one of the pulse and amplitude of the transmitted light, whereby variation in mark pigmentation may be achieved

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(the thermal energy applied to the thermal recording medium Sb varies in amplitude according to the desired density of color in the thermal recording medium Sb) (Fig. 3) (col. 19, lines 22-32).

- (claim 23) at least one optical element (collimator lens 14, cylindrical lens 16, and f- θ lens 22) (Fig. 1).
- (claim 24) at least one optical element incorporates at least one of a single bulk lens, i.e. single lens assembly and a reflector, i.e., reflecting mirror 24 (Fig. 1).
- (claim 26) means for directing the radiation in a plurality of directions (the polygon mirror 20 redirects the laser beam L to scan the deflected laser beam on the surface of the thermal recording medium) (Fig. 1).
- (claim 33) the substrate Sb is colored primarily by photo-chemical reactions brought about by the shining of the laser beam on a given area of said substrate Sb (the thermal recording medium Sb contains materials such as leuco dyes, a developer and light-absorbing dyes, the light absorbing dyes being photo-sensitive to absorb light and generate the heat necessary to develop color) (col. 2, lines 51-61).
- (claim 34) said heater is a pre-heating bar covering the width of the substrate Sb (the elongated preheating light 49 covers the width of the thermal recording medium Sb) (Figs. 10A-B) (col. 8, lines 51-63).
- (claim 35) optical biasing means, comprising a secondary uniform light source which upon actuation shines onto the substrate, achieving an optical density

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just below the marking threshold (the preheating light 47 uniformly preheats the substrate Sb to near but less than the color-developing temperature) (Fig. 6B).

- (claim 36) the optical biasing means 49 further acts to heat the substrate prior to marking (Fig. 6B).

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. in view of Yamakawa et al., as applied to claim 17 above, and further in view of De Bock et al. (US 5,893,018).

Goto et al. in view of Yamakawa et al. discloses all the basic limitations of the claimed invention including the drive electronics (Goto et al., driver 34 driving the laser diode 12, Fig. 1) but fails to teach the heat exchanger.

De Bock et al. teaches a means for heating the toner image on the transfer member includes a pre-heating roller and a pre-cooler roller, the pre-heating roller and the pre-cooler roller acting as a heat exchanger (col. 13, lines 15-43).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Goto et al. to include the teaching of De Bock et al. by incorporating the heat exchanger in the form of a pre-heating and pre-cooling rollers in order to reduce energy loss as suggested by De Bock et al.

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8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. in view of Yamakawa et al., as applied to claim 16 above, and further in view of Goldberg (US 4,383,261).

Goto et al. in view of Yamakawa et al. discloses all the basic limitations of the claimed invention except for the array lasers being configured to be pulsed.

Golberg teaches a method for laser recording to record an image on the recording medium using a semiconductor laser array 60 while dynamically pre-heat the moving recording medium by irradiating the recording medium with another laser 67 at the same spot as that of the laser array 60, the laser beams emitted from the laser 60 being modulated into light pulses (Fig. 5).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Goto et al. to include the teaching of Golberg by modulating the laser beam into light pulses such that the beam spot can be controlled to the desired spot and resolution.

9. Claims 25, 27, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. in view of Yamakawa et al. as applied to claim 31 above, and further in view of Hilbert (US 7,256,803).

Goto et al. in view of Yamakawa et al. discloses all the basic limitations of the claimed invention except for means for switching the path of radiation to selected outputs (claim 25), at least one of a mechanically displaceable optical element, an

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electronically switchable diffractive element, and a branched wave guide (claims 27, 28).

Hilbert discloses a laser thermal printing system configured to mark a thermally active paper 410 by irradiating a plurality of laser beams onto the surface of the thermally active paper 410, which changes color by the generated heat, the system comprising a mechanically displaceable reflector 502 coupled to a motor 504 to direct the plural laser beams onto the surface of the thermally active paper 410 (Fig. 5). Hilbert further teaches the system comprising a laser array 600 having a plurality of laser elements 602 that can be switched in part to expose the surface of the thermally active paper 410 (Fig. 6) (col. 5, lines 5-20).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Goto et al. by incorporating the teaching of Hilbert in order to specifically expose the surface of the thermally active paper according to the image data.

Response to Arguments

10. Applicant's arguments with respect to claims 17-29 and 31-36 have been considered but are moot in view of the new grounds of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hai C Pham/
Primary Examiner, Art Unit 2861
November 8, 2009